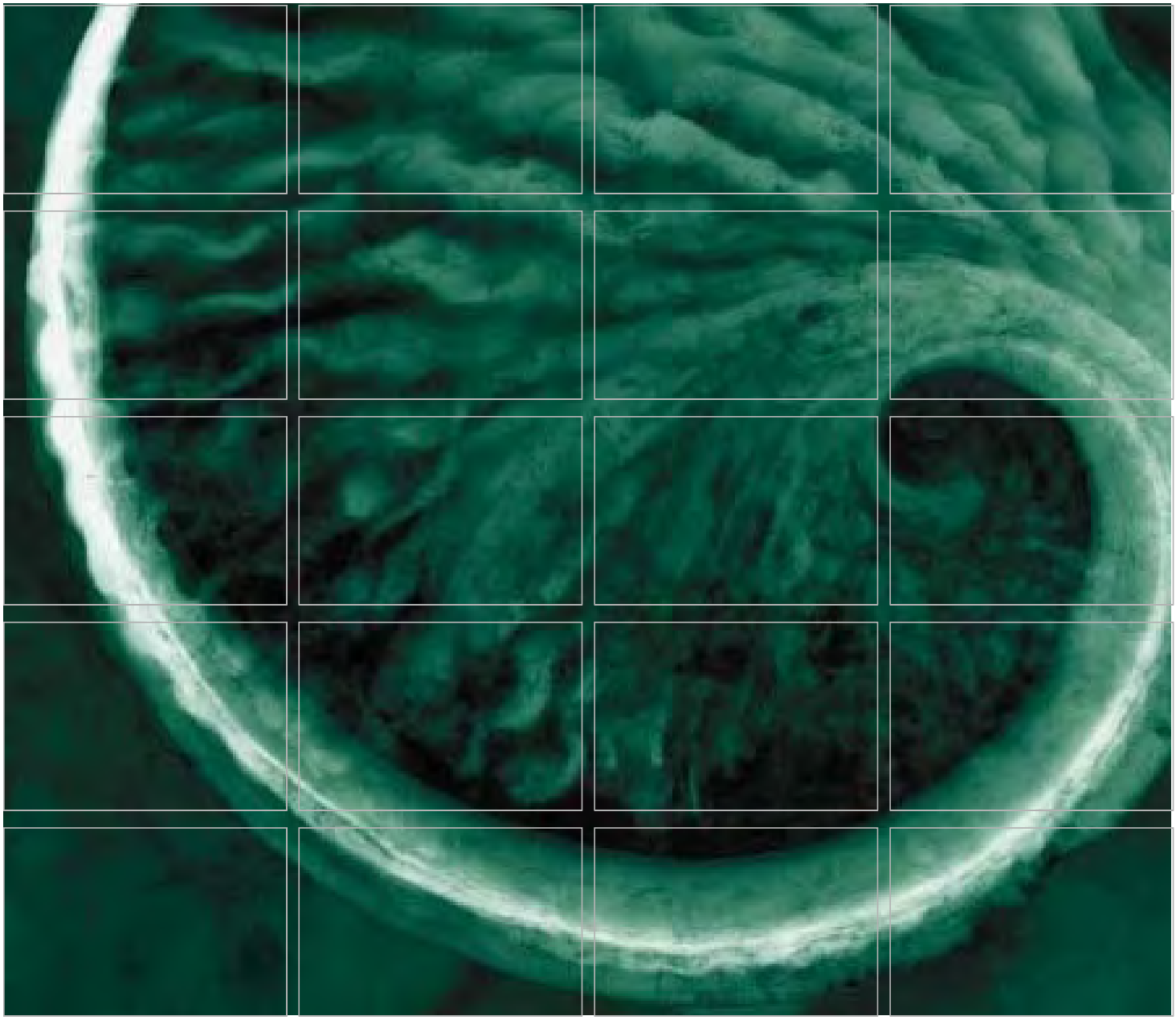


Groundwater Monitoring Report – September 2011

52nd Street Superfund Site Operable Unit 3
Phoenix, Arizona

July 2012

Prepared for:
Motorola 52nd Street
Superfund Site
Operable Unit 3
Working Group

www.erm.com

ERM

Delivering sustainable solutions in a more competitive world

Motorola 52nd Street
Superfund Site Operable Unit 3
Working Group

Groundwater Monitoring Report
September 2011

52nd Street Superfund Site Operable Unit 3
Phoenix, Arizona

July 2012

Project No. 96498

David Abranovic, P.E.
Project Manager

Jason Hilker, R.G.
Project Geologist

Robert Livermore
Partner-in-Charge

Environmental Resources Management
7272 East Indian School Road, Suite 100
Scottsdale, Arizona 85251
T: 480-998-2401
F: 480-998-2106

www.erm.com

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS AND ABBREVIATIONS

µg/L	microgram(s) per liter
1,1-DCE	1,1-Dichloroethene
ADEQ	Arizona Department of Environmental Quality
AOC	Administrative Order on Consent
AWQS	Arizona Aquifer Water Quality Standard
bgs	below ground surface
cis-1,2-DCE	cis-1,2-dichloroethene
CRA	Conestoga-Rovers & Associates
D	Deep Zone
ERM	Environmental Resources Management
ft	foot or feet
FS	Feasibility Study
LCS	Laboratory control sample
LCSD	Laboratory control sample duplicate
M	First Intermediate Zone
M2	Second Intermediate Zone
MS	Matrix spike
MSD	Matrix spike duplicate
OU	Operable Unit
PARCC	Precision, accuracy, representativeness, comparability, and completeness
PCE	Tetrachloroethene
PE	Performance Evaluation
QAPP	Quality Assurance Project Plan
QC	Quality control
RI	Remedial Investigation
RPD	Relative percent difference
S	Shallow Zone
SOW	Statement of Work
TCE	Trichloroethene
US EPA	United States Environmental Protection Agency
VOC	Volatile organic compound

1.0 INTRODUCTION

This groundwater monitoring report presents the September 2011 semiannual groundwater monitoring results for the Motorola 52nd Street Superfund Site, Operable Unit (OU) 3, in Phoenix, Arizona. The Site is separated into three OUs (OU1, OU2, and OU3). OU3, which is hydraulically downgradient (west) of OU2, has been established by the United States Environmental Protection Agency (US EPA) and the Arizona Department of Environmental Quality (ADEQ) to further determine the nature and extent of groundwater contamination between 20th Street and 7th Avenue.

1.1 MOTOROLA 52ND STREET SUPERFUND SITE HISTORY

Figure 1 provides a site location map of the Motorola 52nd Street Superfund Site OUs. The Motorola 52nd Street Superfund Site covers approximately 7,800 acres and consists of three adjoining groundwater OUs described as follows:

- OU1 is the easternmost OU and contains the former Motorola 52nd Street semiconductor plant. The boundaries of OU1 are 52nd Street to the east, Palm Lane to the north, Roosevelt Street to the south, and 44th Street to the west.
- OU2 lies west of OU1 and contains the OU2 Groundwater Extraction System and several OU2 potentially responsible party facilities, including the Honeywell International, Inc. (Honeywell) 34th Street facility. The approximate boundaries of OU2 are Roosevelt Street to the north, 44th Street to the east, Buckeye Road to the south, and 18th Street to the west. The OU2 Groundwater Extraction System is located along 20th Street.
- OU3 lies west of OU2. The boundaries of OU3 are McDowell Road to the north, 20th Street to the east, Buckeye Road to the south, and 7th Avenue to the west.

ADEQ is the lead regulatory agency for OU1 and OU2, and the US EPA is the lead regulatory agency for OU3.

On 4 October 1989, the US EPA placed the Motorola, Inc. (52nd Street Plant) Site on the National Priorities List. Motorola (now Freescale Semiconductor, Inc. [Freescale]) investigated their facility and

implemented the OU1 groundwater extraction and treatment plant beginning in 1992 under ADEQ oversight. Beginning in 1991, investigation activities in OU2 under ADEQ oversight resulted in the selection of the OU2 interim remedy. This consisted of the containment of the groundwater plume (at approximately 20th Street) utilizing a groundwater extraction and treatment system. Freescale and Honeywell (the Companies) constructed and initially operated the OU2 treatment system under US EPA oversight. The Companies recently negotiated an Administrative Order on Consent (AOC) with ADEQ to continue to operate and maintain the system under ADEQ oversight.

In 1983, a groundwater sample, collected from the Eastlake Park irrigation well located in OU3 near 16th Street and Jefferson Street, contained chlorinated volatile organic compounds (VOCs). The Motorola 1992 OU2 Remedial Investigation (RI) report indicated that the chemicals migrating from the Motorola facility extended into the East Washington Project Area, which prompted ADEQ and the US EPA to create the OU3 Study Area (now referred to as OU3) to address potential co-mingled VOC groundwater impacts between 20th Street and 7th Avenue.

1.2 OU3 HYDROGEOLOGY

OU3 groundwater is found primarily within the unconsolidated regional Upper Alluvial Aquifer. Groundwater within the alluvial aquifer flows toward the west and southwest (Shaw 2009). Four hydrostratigraphic zones – Shallow (S), First Intermediate (M), Second Intermediate (M2), and Deep (D) – were originally designated in OU3 (US EPA 2009). Lithologic descriptions of these zones are provided in Table 1.

Following agreement with ADEQ and US EPA during a technical working group meeting in January 2011, the hydrostratigraphic nomenclature for OU3 was revised to be more consistent with OU1 and OU2 and the overall Motorola 52nd Street Superfund Site. The S- Zone, M- Zone, and M2- Zone correlate to the Salt River Gravels Sub-unit, and the D- Zone correlates to the Basin Fill Sub-unit. Per a request from US EPA, potentiometric surface and the trichloroethene (TCE) iso-concentration contour maps were developed for the upper zone of the River Gravels Sub-unit (Upper Salt River Gravels), the lower zone of the Salt River Gravels Sub-unit (Lower Salt River Gravels), and the Basin Fill Sub-unit.

Table 1 ***OU3 Hydrostratigraphic Zones***

Aquifer Unit	Original Hydrostratigraphic Zone	Revised Hydrostratigraphic Zone	Description
	Shallow Zone (S)	Upper Salt River Gravels Sub-unit	Coarse-grained Salt River Gravels, including minor amounts of interbedded and laterally discontinuous fine-grained deposits.
Upper Alluvial Aquifer	First Intermediate Zone (M)	Lower Salt River Gravels Sub-unit	Coarse-grained deposits dominated by gravel similar to Salt River Gravels. Base of zone commonly includes a fine-grained layer.
	Second Intermediate Zone (M2)	Lower Salt River Gravels Sub-unit	Coarse-grained deposits dominated by gravel similar to Salt River Gravels.
Middle Alluvial Aquifer	Deep Zone (D)	Basin Fill Sub-unit	Basin fill deposits consisting of an upper fine-grained layer with an underlying interval of interbedded fines and sand.

1.3 PREVIOUS SITE INVESTIGATIONS

Three phases of groundwater investigation have been conducted in the area now known as OU3. Phases I and II were conducted by the US EPA pursuant to the Arizona Water Quality Assurance Revolving Fund program. The scope of work for the Phase I and II field programs were presented in the following documents:

- *Final Groundwater Investigation Work Plan, Motorola 52nd Street Superfund Site Operable Unit 3 Study Area, Phoenix, Arizona* (IT 2001).
- *Work Plan Supplement to the Final Groundwater Investigation Work Plan for Proposed Phase II Wells, Motorola 52nd Street Superfund Site Operable Unit 3 Study Area* (IT 2003).

Phases I and II included construction of the following groundwater monitoring wells:

- Phase I: Fifteen groundwater wells were installed from February to May 2002.
- Phase II: Thirteen groundwater wells were installed from May to July 2003. This phase included the abandonment and replacement of three Phase I wells (OU3-5S/M/D).

The OU3 Working Group—comprised of Honeywell International, Inc. and Arizona Public Service Company, a subsidiary of Pinnacle West—entered into an AOC with the US EPA on 23 September 2009 (US EPA 2009). The Statement of Work (SOW) for the OU3 Working Group was included as Appendix A of the AOC. In accordance with the AOC

and SOW, the OU3 Working Group became responsible for the OU3 groundwater monitoring program beginning in March 2010. The OU3 monitoring program consists of semiannual sampling events that are performed in conjunction with the Phase III OU3 Remedial Investigation (RI) and Feasibility Study (FS) (OU3 Working Group 2009).

The scope of the Phase III RI/FS field program was presented in the *Final OU3 Phase III Groundwater RI/FS Work Plan (*Work Plan*)* approved by the US EPA on 15 July 2010 (Environmental Resources Management [ERM] 2010). Phase III was initiated by the OU3 Working Group in 2010. Seven groundwater monitoring wells (OU3-16S, OU3-10S, OU3-17S, OU3-20S, OU3-16M, OU3-19M, and OU3-20M) were installed. All wells were installed within the Salt River Gravels Sub-unit. Wells OU3-16S, OU3-10S, OU3-17S, and OU3-20S were installed in the Upper Salt River Gravels Sub-unit to provide data on the eastern, western, and southern extent of the plume. Wells OU3-16M, OU3-19M, and OU3-20M were installed in the Lower Salt River Gravels Sub-unit to provide data on the southern and western edges of the plume and to better define the central and eastern core of the plume. Further information regarding the installation of these wells is included in the *Final Groundwater Monitoring Well Installation Report, Motorola 52nd Street Superfund Site, Operable Unit 3 Study Area, Phoenix, Arizona*, submitted in June 2011 (ERM 2011a).

In accordance with the SOW, four quarters of sampling of Phase III wells is being conducted separately from OU3 semiannual monitoring of the Phase I and II wells. Reporting of the monitoring results for the new wells is done separately through submission of data reports and is not presented in the semiannual groundwater monitoring reports. However, analysis of the combined data sets will be conducted as part of the overall RI. Upon completion of the four quarters of new well monitoring (completed with the September 2011 sampling event), these wells will be incorporated into the OU3 semiannual monitoring program, as appropriate.

Figure 2 provides a site plan of all OU3 groundwater monitoring program well locations. Table 2 (attached) provides the OU3 monitoring well construction details.

1.4 PURPOSE AND SCOPE

The purpose of this groundwater monitoring program is to evaluate the trends in VOCs within OU3 groundwater. The groundwater monitoring

program provides data to support the OU3 RI/FS. The OU3 groundwater monitoring program is coordinated with other investigations in the region and includes the following activities:

- Semiannual measurement of groundwater levels in wells included in the OU3 groundwater monitoring program.
- Semiannual collection of groundwater samples for laboratory analysis.
- Evaluation of groundwater hydraulic and water quality data.

Groundwater monitoring activities performed during the September 2011 event were conducted according to the methodology and procedures in the Work Plan and those discussed in *Technical Memorandum No.1* (ERM 2011b).

1.5 REPORT ORGANIZATION

Section 1.0 identifies the site background information and the purpose and scope of the groundwater monitoring program. Section 2.0 describes the groundwater monitoring program and the field and analytical methods incorporated into the program. Section 3.0 describes the September 2011 groundwater monitoring results. Section 4.0 contains the references cited within this document.

2.0 GROUNDWATER MONITORING ACTIVITIES

The September 2011 groundwater monitoring event was conducted from 6 to 20 September 2011. Table 2 (attached) provides a list of wells sampled during this event, as well as construction details for each well sampled.

The following sections briefly describe the procedures followed and protocols used by ERM to conduct this groundwater monitoring event. The groundwater monitoring program followed the requirements set forth in the Work Plan to ensure that the data collected were of consistent quality. This semiannual monitoring event included the following activities:

- Groundwater level measurements;
- Groundwater purging and sampling;
- Sample analysis;
- Decontamination; and
- Investigation-derived waste management.

A summary of the methodology used to conduct each of these activities is discussed in the following subsections. A detailed description of the procedures and methodology used during this groundwater monitoring event is provided in the Field Sampling Plan and Quality Assurance Project Plan (QAPP), included as Appendices A and B of the Work Plan (ERM 2010), respectively.

2.1 GROUNDWATER LEVEL MEASUREMENTS

Prior to groundwater sampling, static groundwater levels and well depths were measured in each monitoring well included in the OU3 groundwater monitoring program. On 6 September 2011, all but three water levels were measured to the nearest 0.01-foot utilizing an electric water level indicator capable of producing measurements accurate to within ±0.01 foot. Water level measurements of monitoring wells OU3-11M2 and OU3-10S were delayed until 7 and 13 September 2011, respectively, due to accessibility issues. Water levels were collected from monitoring well EW-13 on 16 September 2011 using specialized Westbay® gauging and sampling equipment.

Groundwater elevation contour maps (Figures 3, 4, and 5) were generated using the measurements collected on 6, 7, 13, and 16 September 2011 from the Upper and Lower Salt River Gravels Sub-units and Basin Fill Sub-unit.

2.2 *GROUNDWATER PURGING AND SAMPLE COLLECTION*

The groundwater monitoring wells were purged using an electric submersible pump or a disposable bailer. At the start of purging, and at intervals during purging; the water quality parameters; pH, temperature, conductivity, dissolved oxygen, and oxidation-reduction potential were measured (field parameters). Field parameters were measured with a Horiba U-52 multi-meter attached to a flow-through cell from 8 to 16 September 2011. On 19 and 20 September 2011 the Horiba was exchanged for a YSI 556MPS due to a malfunction of the Horiba meter. Field parameters and qualitative observations, including odor, clarity, and/or color, were recorded on groundwater sampling field data collection forms provided in Appendix A.

Purging was considered complete after a minimum of three saturated well volumes were removed and after the following field parameters had stabilized for three consecutive readings:

- pH within ± 0.1 unit;
- Temperature within ± 1.0 degree; and
- Conductivity within 10 percent.

After the purge was completed, the groundwater sample was collected from the pump outlet or with a disposable bailer. A sample label containing a unique identification number was attached to each sample container and the sample was recorded on a chain-of-custody form. Samples analyzed for VOCs were collected in 40-milliliter vials pre-preserved with hydrochloric acid. Samples analyzed for 1,4-dioxane were collected in 1-liter amber glass bottles. All sample containers were provided by TestAmerica, Inc. Samples were immediately placed in a cooler containing ice. A trip blank prepared by the laboratory was also placed in the cooler.

ERM field personnel were responsible for ensuring the proper preservation, packaging, labeling, documentation, storage, handling, and transportation of groundwater samples collected during this sampling event. Groundwater samples were hand-delivered daily to the Phoenix, Arizona facility of TestAmerica, Inc., an Arizona-certified laboratory (ADHS# AZ0728), under standard chain-of-custody procedures. All

samples were received by TestAmerica, Inc. in accordance with the requirements of Section 3.3.3 of the QAPP (ERM 2010).

2.3 *SAMPLE ANALYSIS*

All groundwater samples collected during this groundwater monitoring event were analyzed by TestAmerica, Inc. using the following methods:

- VOCs by US EPA Test Method 8260B.
- 1,4-Dioxane by US EPA Test Method 8270C.

A complete listing of the September 2011 analytical results is provided in Appendix B.

2.4 *DECONTAMINATION*

Purging and sampling equipment were decontaminated before use at each groundwater monitoring well in accordance with Appendix A, Section 5.11.3 of the Work Plan (ERM 2010). Submersible pumps were utilized for purging and sample collection, except as described in Section 2.6.

Submersible pumps and galvanized steel drop-pipe or flexible tubing were decontaminated using the following procedures:

- The exterior of the pump or other non-dedicated equipment was placed on a piece of Visqueen film and then washed with a power washer. The Visqueen was folded so that it had edges to contain the decontamination water. The water contained within the folded Visqueen was then poured into the portable holding tank for later discharge to the City of Phoenix sanitary sewer.
- The exterior of the pump was washed with Alconox solution. Alconox solution was also sprayed into the pump until extruded from the intake port. Any piping or tubing used, such as a reel pump, had Alconox solution sprayed on both the exterior and interior of the piping/tubing.
- The equipment exterior was then washed with a power washer. Piping was washed both inside and out by circulating water though the tubing, via the discharge manifold, so that at least 5 gallons of tap water flowed through the tubing and extruded from the pump.
- The submersible pump was then submerged in a container containing distilled water and operated until approximately 5 gallons had been circulated through and extruded from the pump.

Field monitoring instrumentation and water level meters were decontaminated before use at each well. Each was decontaminated by spraying the surfaces with Alconox solution, rinsing with distilled water, and air-drying.

2.5 INVESTIGATION-DERIVED WASTE MANAGEMENT

Purge and decontamination water was contained in a portable tank and the water was discharged directly to the sanitary sewer under the permit issued by the City of Phoenix on 17 August 2011 (Appendix C). Miscellaneous waste, such as used personal protective equipment, disposable sampling equipment, polyethylene sheeting, and general trash, was disposed of as municipal solid waste.

2.6 DEVIATIONS FROM THE WORK PLAN

Deviations to the procedures in the Work Plan included the following:

- EW-13 was not gauged in the first 48 hours of the sampling event due to scheduling conflicts and equipment availability.
- OU3-10S was not gauged in the first 48 hours of the sampling event. Due to access issues, the water level measurement was performed on 13 September 2011.

All other procedures in the Work Plan were followed during the September 2011 groundwater monitoring event.

3.0 SEPTEMBER 2011 GROUNDWATER MONITORING RESULTS

During the September 2011 semiannual groundwater monitoring event, groundwater samples were collected from 36 monitoring wells and the 4 ports of Westbay® multi-port well EW-13. IN-MW-1 was gauged, but not sampled due to insufficient water in the well. Of the monitoring wells and ports that were sampled, 14 were screened in the Upper Salt River Gravels Sub-unit, 16 were screened in the Lower Salt River Gravels Sub-unit, and 10 were screened in the Basin Fill Sub-unit.

This OU3 September 2011 semiannual groundwater report also contains non-OU3 groundwater analytical data transmitted by Conestoga-Rovers & Associates (CRA) to ERM (CRA 2011). The non-OU3 program wells that were used to develop Figures 3 through 5 (groundwater elevation contours) and Figures 6 through 8 are listed in Table 7 (attached).

3.1 GROUNDWATER LEVEL MEASUREMENT SUMMARY

Groundwater elevations measured in the OU3 program monitoring wells during this monitoring event are summarized in Table 3 (attached). Figures 3 through 5 present the September 2011 groundwater elevation contours for the Upper and Lower Salt River Gravels Sub-unit wells, and the Basin Fill Sub-unit wells, respectively. Groundwater elevation data from the wells that were not sampled as part of the OU3 monitoring program (non-OU3 program wells) were used in the interpretations presented in Figures 3 through 5.

Groundwater elevation data for wells OU3-13D and EW-22D were not used for the Basin Fill Sub-unit potentiometric map. Data from well OU3-13D have historically been anomalous (Shaw 2010) and therefore difficult to integrate into the site-wide potentiometric interpretation. The water level measurement from well EW-22D was not used because it is screened from 407 to 427 feet below ground surface (bgs), which is over 120 feet below the other OU3 Basin Fill Sub-unit monitoring wells (Shaw 2010). This area is also hydrologically complex due to the OU2 groundwater extraction system and nearby bedrock ridge.

The groundwater elevations decreased in all 41 of the OU3 groundwater monitoring wells gauged during the September 2011 event relative to March 2011 data, with an average decrease of 4.72 feet.

Table 4 summarizes groundwater levels by hydrostratigraphic zone. Table D-1 in Appendix D contains a tabulation of historical water levels.

Table 4 ***Groundwater Level Summary***

Hydrostratigraphic Zone	Range of Depth to Groundwater (ft bgs, min/max)	Range of Groundwater Elevations (ft amsl, min/max)	Maximum Groundwater Change* (ft)
Upper Salt River Gravels Sub-unit	85.48 (BE-MW-8)/ 98.82 (EWOU3-10S-R)	982.80 (EWOU3-10S-R) / 1,007.19 (EW-13-118)	-8.56 (EWOU3-10S-R)
Lower Salt River Gravels Sub-unit	85.45 (OU3-12M)/ 98.89 (OU3-10M2)	983.40 (OU3-10M2) / 1,008.66 (OU3-2M)	-8.92 (OU3-10M2)
Basin Fill Sub-unit	79.63 (EW-19D)/ 90.80 (OU3-8D)	989.20 (OU3-8D) / 1,015.96 (OU3-14D)	-8.28 (OU3-8D)

Notes: bgs = below ground surface; amsl = above mean sea level; min = minimum; max = maximum
* = Since previous semiannual groundwater monitoring event.

Based on the groundwater elevations from this gauging event, the estimated groundwater gradients from west of 16th Street are shown in Table 5, along with the wells used to determine the gradient. These gradients were calculated using the 3-point method. It should be noted that the groundwater gradients were not calculated for the area east of 16th Street due to the depression of the potentiometric surface caused by the operation of the OU2 groundwater extraction system.

Table 5 ***Estimated Groundwater Gradients***

Hydrostratigraphic Zone	Gradient	Wells Used To Calculate Gradient
Upper Salt River Gravels Sub-unit	0.0025 ft/ft west-southwest	EWOU3-10S-R, OU3-4S, and SC-MW-1D
Lower Salt River Gravels Sub-unit	0.0023 ft/ft west	OU3-10M, OU3-14M, and OU3-12M
Basin Fill Sub-unit	0.0029 ft/ft west-southwest	OU3-8D, OU3-6D, and OU3-14D

3.2 ANALYTICAL RESULTS SUMMARY

A total of 43 samples were collected from 40 wells during the September 2011 groundwater monitoring event. A summary of analytes detected is provided in Table 6 (attached). Figures 6 through 8 present TCE data for the Upper and Lower Salt River Gravels Sub-unit wells and Basin Fill Sub-unit wells, respectively. TCE concentration data from several wells

not sampled as part of the OU3 monitoring program were also used in Figures 6 through 8. TCE data from selected non-OU3 program wells were used to illustrate TCE distribution along the OU2/OU3 boundary.

The following analytes were detected above their respective Aquifer Water Quality Standards (AWQS) during the September 2011 groundwater monitoring event:

- TCE was detected above the AWQS of 5 micrograms per liter (µg/L) in samples from 12 wells (EWOU3-10S-R, EW-19S, EW-20, OU3-2M, OU3-5M2, OU3-5MR, OU3-5SR, OU3-8S, OU3-8M2, OU3-10M, OU3-10M2, and OU3-13M) during the September 2011 event. Concentrations ranged from 6.1 (OU3-8S) to 75 µg/L (OU3-5M2). Thirteen wells in the OU3 monitoring program exceeded the TCE AWQS in March 2011 (ERM 2011c). The average TCE AWQS exceedance was approximately 0.4 µg/L lower in September than in March.
- Tetrachloroethene (PCE) was detected above the AWQS of 5 µg/L in 1 well during the September 2011 event, BE-MW-8, at 5.2 µg/L. The PCE concentration in well BE-MW-8 during the March 2011 event was 8.8 µg/L (ERM 2011c).
- 1,1-Dichloroethene (1,1-DCE) was detected above the AWQS of 7 µg/L in samples from 2 wells (OU3-5M2 and OU3-10M2), at concentrations of 7.9 (OU3-5M2) and 9.4 µg/L (OU3-10M2). Samples from these 2 wells, and 2 others (OU3-2M and OU3-5MR), exceeded the AWQS during the March 2011 event (ERM 2011c).
- None of the OU3 wells exceeded the AWQS of 70 µg/L for cis-1-2-dichloroethene (cis-1,2-DCE) in the September 2011 groundwater monitoring event.

The compound 1,4-dioxane was detected in 11 of the 40 wells sampled during the September 2011 groundwater monitoring event. The majority of the 1,4-dioxane results were near or below the laboratory's practical quantitation limit of 1.0 µg/L, and no 1,4-dioxane concentration exceeded 3.5 µg/L. The highest concentration, 3.1 µg/L, was measured in the sample collected from well OU3-10M2. Regulatory standards have not been promulgated for 1,4-dioxane, although the US EPA has listed the compound as a probable human carcinogen and has a Drinking Water Advisory Level of 3.0 µg/L. ADEQ has not promulgated a 1,4-dioxane groundwater standard.

Appendix E provides time-concentration graphs for TCE, PCE, 1,1-DCE,

and cis-1,2-DCE, versus groundwater elevation for all OU3 program monitoring wells. The available historical data from the non-OU3 (Shaw 2010 and CRA 2011) and OU3 (Shaw 2010) program wells were included in constructing the graphs.

Time-concentration graphs indicate the concentrations of TCE, PCE, 1,1-DCE, and cis-1,2-DCE have decreased site-wide since the OU3 groundwater monitoring program was initiated in June 2002. Over this period of time, 13 monitoring wells have shown decreases in TCE concentration of 1 order of magnitude or more. These wells include EW-19S, EWOU3-10S-R, EW-20, EW-21, GH-MW-11, OU3-1M, OU3-2M, OU3-6M, OU3-10M, OU3-10M2, OU3-12M, OU3-12D, OU3-13M, OU3-13D, OU3-14M, and OU3-14D. Wells EWOU3-10S-R and OU3-10M are located near the plume's southern boundary near Washington Street and 1st Street. The other wells are located within the southern, central, and northern portions of the plume between 5th and 16th Streets (Figures 6, 7, and 8).

3.3 QUALITY ASSURANCE/QUALITY CONTROL RESULTS SUMMARY

Field quality control (QC) samples were collected or prepared to evaluate if sampling practices affected the analytical results. Field QC samples consisted of field duplicates, trip blanks, and equipment rinsate samples. All samples received by TestAmerica, Inc. were between 0 and 5 degrees Celsius.

This report contains data that were not collected as part of the OU3 monitoring program and, therefore, were not included in the OU3 data validation process. Data not collected, nor validated, as part of the OU3 monitoring program was obtained from CRA (CRA 2011).

The OU3 September 2011 semiannual groundwater monitoring event's project data were validated in accordance with Section 4.1 of the QAPP for compliance with project quality assurance/quality control (QA/QC) requirements, which included an evaluation of field and laboratory QC sample analyses. Samples were analyzed for VOCs and 1,4-dioxane in accordance with the Work Plan.

Field QC: The field QC samples associated with the OU3 groundwater sampling event included field duplicate samples, equipment rinsate blanks, field blanks, matrix spikes (MS)/matrix spike duplicates (MSD), trip blanks, and a Performance Evaluation (PE) sample. Field duplicate

samples were used to evaluate overall field sample precision and were collected at a frequency of one duplicate for every twenty samples, for a total of three duplicate samples. Field duplicate samples were evaluated by calculating the control limit between the sample and its duplicate.

Acceptable precision control limit criteria were established at a maximum Relative Percent Difference (RPD) of ± 20 percent. Of the three field duplicate pairs collected, two had RPDs of ≤10 percent for all analytes. The third duplicate pair, EW-20-S-091511/EW-20-S-091511-Q1 showed an RPD of ≤10 percent for all analytes but 1,2-DCE. The RPD for 1,2-DCE was calculated as 21 percent. Thus, the overall analytical and sampling precision for this sampling event was considered acceptable, but the 1,2-DCE result at EW-20 was flagged.

Eight equipment rinsate blanks and eight trip blanks were collected during the sampling event. These were analyzed for VOCs only. The trip blank identified as GW-L1-4-031311 and delivered to the laboratory on 13 September 2011, was shown to contain the analyte TCE at a concentration of 0.55 µg/L. No other trip blanks were found to contain analytes. No analytes were detected in the eight equipment rinsate blanks other than trihalomethanes (chloroform, bromodichloromethane, and dibromochloromethane), typically found in disinfected water such as that used to make the equipment blank, indicating good data quality sufficient to meet data quality objectives.

One PE sample was collected during the September 2011 groundwater sampling event, per the Work Plan. This was coordinated with US EPA to provide an external review of laboratory performance. The PE sample was obtained from the US EPA Quality Assurance Technical Support Laboratory, operated for the US EPA by Shaw Environmental. The PE sample contained certified concentrations of the target compounds that were anticipated to be identified at OU3. The PE sample was submitted to the laboratory double-blind; the sample was introduced as part of the daily sampling event in the field and was analyzed by the laboratory with a field specific identity number of GW-Z1-1-091311. This process conformed to the requirements in the Work Plan.

Laboratory QC: Data were evaluated in terms of precision, accuracy, representativeness, comparability, and completeness (PARCC) parameters. The PARCC parameters were evaluated for the September 2011 groundwater data set as follows:

Precision: Precision was expressed as RPD between the results of replicate sample analyses: sample duplicates, laboratory control sample duplicates (LCSD), and the MSD. When analyte RPDs exceeded acceptance criteria, results were flagged, as appropriate.

For the September 2011 groundwater monitoring event, most LCSD and MSD results were reported within project control limits. If the LCSD or MSD sample results were reported outside of the project control limits, due to high or low surrogate recoveries, the data were flagged with either UJ or J. UJ indicates that the analyte was analyzed for but not detected; thus, the sample detection limit is an estimated value. J indicates that the reported result is an estimated value.

Accuracy: Accuracy was demonstrated by recovery of target analytes from spiked blank and sample matrices, laboratory control samples (LCSs), and MS samples. For organic methods, accuracy was also demonstrated through recovery of surrogates from each field and QC sample. The recovery of target analytes from spiked samples was compared to prescriptive acceptance criteria. When these criteria were not met, the data were flagged, as appropriate.

For the September 2011 groundwater monitoring event, most of the LCS and MS sample results were reported within project control limits. The surrogate recoveries that were only marginally outside project control limits were flagged, but did not impact data usability.

Representativeness: Representativeness of the samples submitted for analysis was ensured by adherence to standard sampling techniques documented in the Work Plan.

Comparability: Comparability of sample results was ensured using approved sampling and analysis methods specified in the Work Plan.

Completeness: One of the samples, IN-MW-1, could not be collected because of a dry well, thus giving a 97 percent field completeness for the project. Based on results of data validation for the samples submitted for laboratory analysis, analytical completeness was approximately 99 percent. Analytical completeness was less than 100 percent due to qualification (i.e., addition of U and/or J flags) of some of the analytes for a small number of the samples. None of the flagged results were considered unusable; therefore, technical completeness was 100 percent.

In conclusion, the analytical results generally met the project PARCC objectives. No data for the environmental samples were rejected and any data quality issues, as discussed above, were identified. Therefore, the results associated with the sampling event were of good quality and useable for the intended purpose.

3.4 DATA VALIDATION

A Tier 1 data validation was done on all laboratory data collected during the OU3 September 2011 groundwater monitoring event, and a Tier 3 data validation was done on 10 percent of the data, in accordance with the QAPP. Data validation was performed to evaluate the overall data quality and identify any non-conformances in field or laboratory activities. No samples collected during this monitoring event were flagged for 1,1-DCE or TCE analysis, although PCE and cis-1,2-DCE analyses were flagged for several samples. All laboratory and validation data qualifiers are summarized in Table 6. The validation determined that all project requirements and completeness were met, and all data collected during the September 2011 groundwater monitoring event are valid to be used for decision-making purposes. A complete data validation report for the OU3 September 2011 semiannual groundwater monitoring event is provided in Appendix F.

This September 2011 groundwater monitoring report contains non-OU3 laboratory analytical data transmitted to ERM from CRA (CRA 2011).

4.0 REFERENCES

Conestoga-Rovers & Associates Engineering, Inc (CRA). 2011. *Data transmittals received from CRA on 12/6/11 and 12/19/11.*

Environmental Resources Management (ERM). 2010. *Final OU3 Phase III Groundwater Remedial Investigation and Feasibility Study Work Plan, Motorola 52nd Street Superfund Site, Operable Unit 3 Study Area, Phoenix, Arizona.*

ERM. 2011a. *Final Groundwater Monitoring Well Installation Report, Motorola 52nd Street Superfund Site, Operable Unit 3 Study Area, Phoenix, Arizona*, June 2011.

ERM. 2011b. *Technical Memorandum No.1 – Proposed changes to Appendix A-Statement of Work for OU3 Remedial Investigation/Feasibility Study Motorola 52nd Street Superfund Site, Operable Unit 3; Proposed Groundwater Monitoring Well OU3-17S and Updated Schedule*, January 2011.

ERM. 2011c. *Draft Groundwater Monitoring Report – March 2011, Motorola 52nd Street Superfund Site, Operable Unit 3 Study Area, Phoenix, Arizona,*. March 2011.

IT Corporation. 2001. *Final Groundwater Investigation Work Plan*, *Motorola 52nd Street Superfund Site, Operable Unit 3 Study Area, Phoenix, Arizona.*

IT Corporation. 2003. *Work Plan Supplement to the Final Groundwater Investigation Work Plan for Proposed Phase II Wells, Motorola 52nd Street Superfund Site Operable Unit 3 Study Area.*

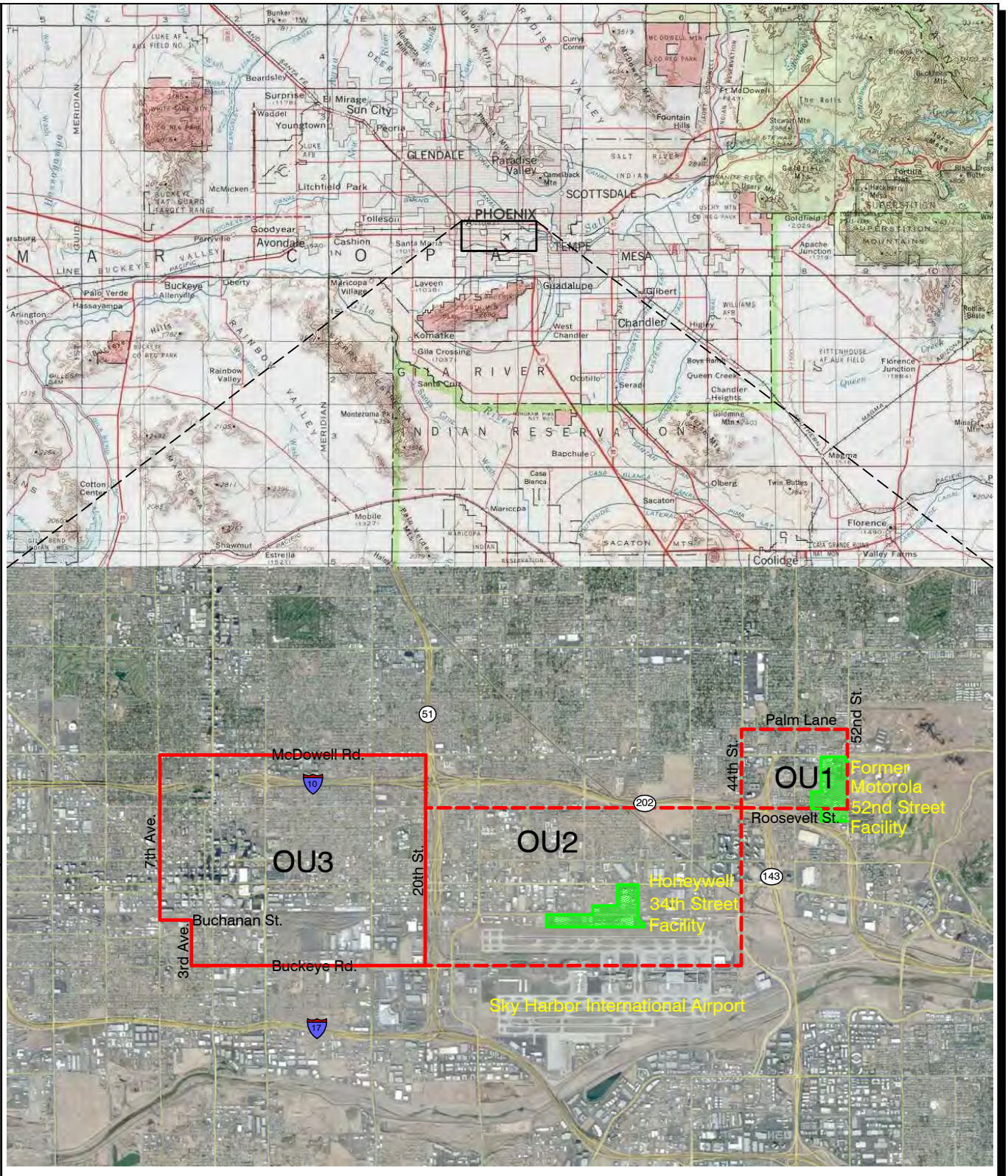
OU3 Working Group. 2009. *Appendix A, Statement of Work for OU3 Remedial Investigation/Feasibility Study, Motorola 52nd Street Superfund Site, Operable Unit 3*, August 8, 2009.

Shaw Environmental, Inc. 2009. *Final Groundwater Investigation Report. Phase I and II Well Installation, Motorola 52nd Street Superfund Site Operable Unit 3 Study Area, Phoenix, Arizona*.

Shaw Environmental, Inc. 2010. *Groundwater Monitoring Report for Motorola 52nd Street Superfund Site Operable Unit 3 Study Area Phoenix, Arizona, September 2009*. Document Control Number: ACE12-274-H.

US EPA. 2009. *Administrative Settlement Agreement and Order on Consent for Remedial Investigation and Feasibility Study*. EPA Region IX. Docket No. 2008-17.

Figures



References:
TOPO!® Software
U.S.G.S. 500k Map Series; Phoenix, Arizona
Aerial Photo Source: © 2009 Google
Earth Pro Ver 5.0.11733.9347

Figure 1
Site Location Map
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona

ERM 02/12

Project No. 0096498.029
Date: 02/14/12
Drawn By: R. Olson
CAD File: G:\0096498\029\009649829-22.dwg

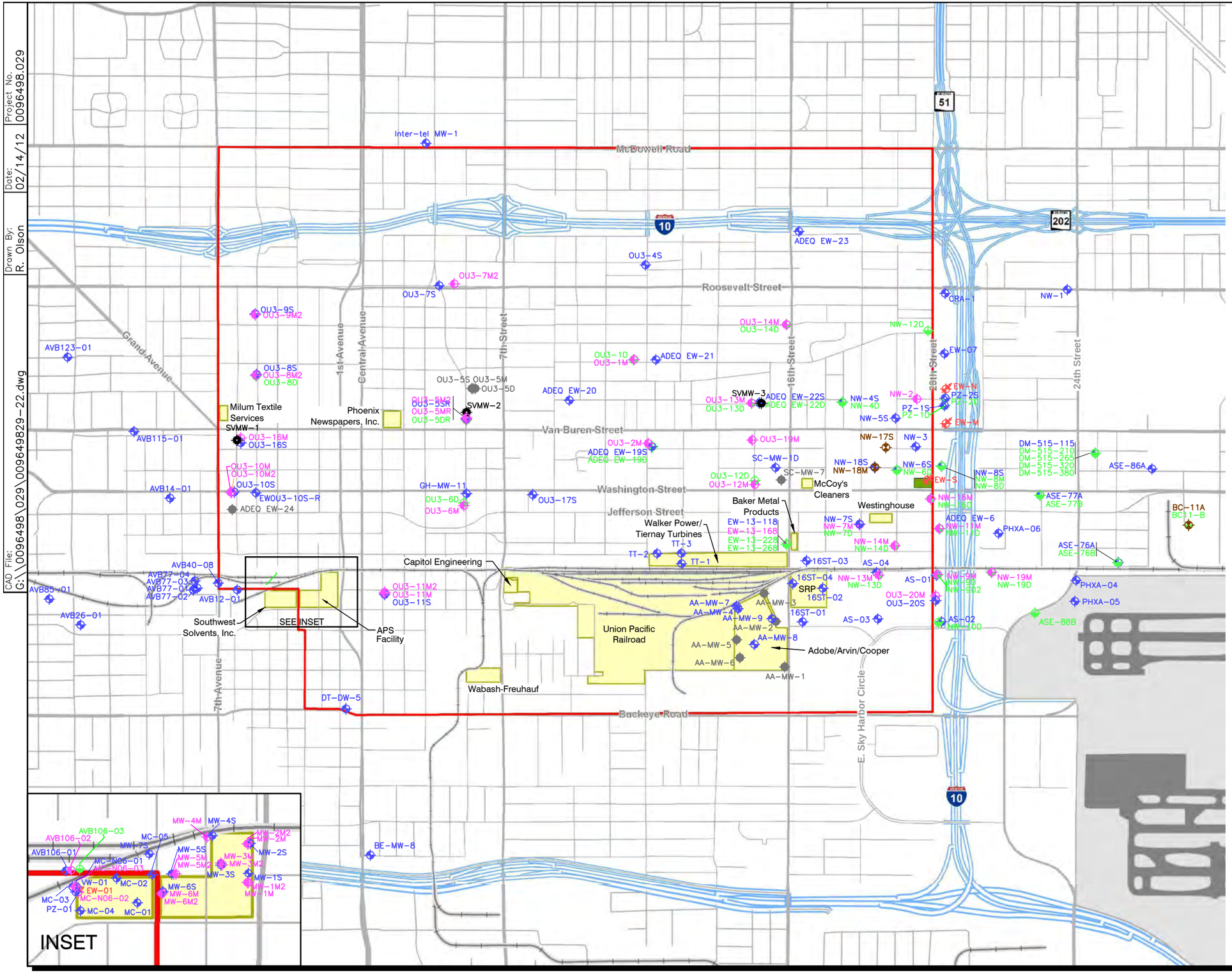
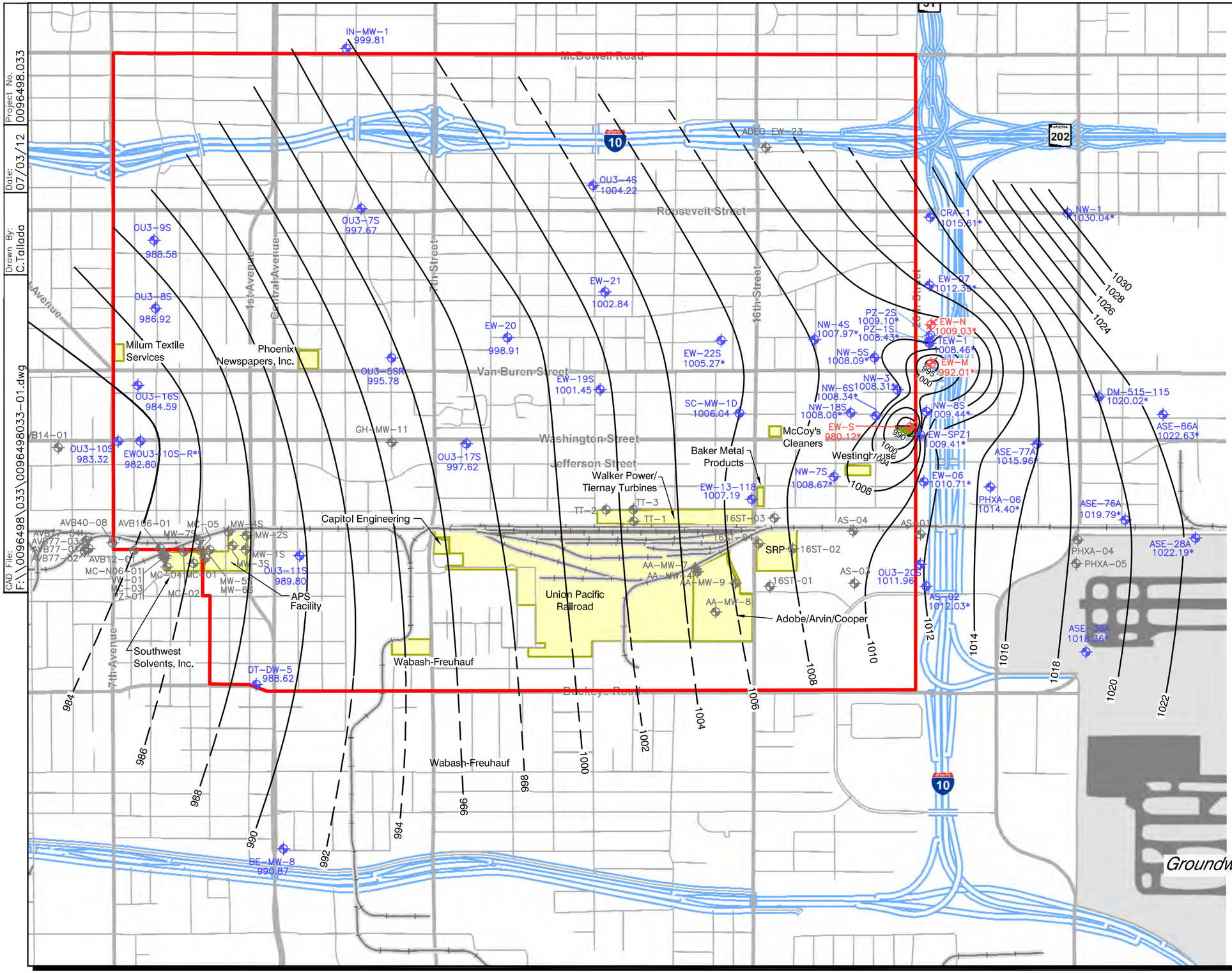


Figure 2
Well Locations
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona
ERM 02/12

Project No. 0096498.033
Date: 07/03/12
Drawn By: C.Tallada
CAD File: F:\0096498\033\0096498033-01.dwg



LEGEND

Salt River Gravels Sub-unit

- Upper Salt River Gravels (U-SRG) Groundwater Well
- Upper Salt River Gravels (U-SRG) Piezometer
- OU2 Groundwater Extraction Well
- Well Not Monitored by the OU3 Working Group
- 996 — Groundwater Elevation Contour (ft amsl); Dashed Where Inferred; Contour Interval = 2 feet
- 995.97 Groundwater Elevation (ft amsl) in OU3 Monitoring Well, September 2011
- 1012.39* Groundwater Elevation (ft amsl) in CRA Monitoring Well, September 2011
- ** Not Used for Contouring
- NM Not Measured
- ft amsl Feet Above Mean Sea Level

Note: Data for OU3-10S, OU3-16S, OU3-17S, and OU3-20S were reported from 3rd Quarter New Groundwater Wells Sampling Event – September 2011

- OU3 Boundary
- OU2 Groundwater Treatment Facility
- PRP Location

N

0 1600
Approx. Scale (feet)

Figure 3
Upper Salt River Gravels Sub-unit
Groundwater Contour Map - September 2011
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona

ERM 07/12

Project No. 0096498.29
Date: 02/14/12
Drawn By: R. Olson
CAD File: G:\0096498\29\0096498291-17.dwg

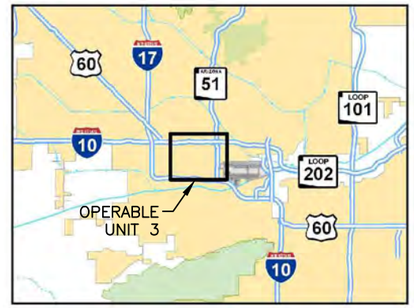
McDowell Road
Roosevelt Street
Van Buren Street
Washington Street
Jefferson Street
Buckeye Road

1st Avenue
Central Avenue
7th Street
7th Avenue
16th Street
20th Street

OU3-9M2 990.83
OU3-8M2 987.49
OU3-16M 984.49
OU3-10M 983.55
OU3-10M2 983.40
OU3-7M2 997.89
OU3-5M2 995.64
OU3-5M 995.72
OU3-6M 994.31
OU3-1M 1002.27
OU3-2M 1008.66**
OU3-14M 1007.75
OU3-13M 1005.41
OU3-19M 1005.50
OU3-12M 1005.34
OU3-11M2 989.66
OU3-11M 989.71
MW-3M2
MW-2M2
MW-1M2
MW-5M2
MW-6M2
MC-NO6-03
NW-2 1008.72*
NW-17S 1008.22*
NW-18M 1008.10*
NW-7M 1008.01*
NW-14M 1009.73*
NW-13M 1009.57*
EW-N 1009.03*
EW-M 992.01*
EW-S 980.12*
NW-16M 1009.88*
NW-11M 1010.55*
NW-9M 1012.77*
NW-19M 1013.72*
OU3-20M 1011.77*
EW-13-168 1007.20

Milum Textile Services
Phoenix Newspapers, Inc.
Capitol Engineering
Southwest Solvents, Inc.
APS Facility
Union Pacific Railroad
Wabash-Freuhauf
Baker Metal Products
McCoy's Cleaners
Walker Power/ Tiernay Turbines
Westinghouse
SRP
Adobe/Arvin/Cooper

992 994 996 998 1000 1002 1004 1006 1008 1010 1012



LEGEND

Lower Salt River Gravels Sub-unit

- Lower Salt River Gravels (L-SRG) Groundwater Well
- Colluvium Zone Monitoring Well
- OU2 Groundwater Extraction Well, Not Used for Contouring
- Well Not Monitored by the OU3 Working Group
- 996 — Groundwater Elevation Contour (ft amsl); Dashed Where Inferred; Contour Interval = 2 feet
- 995.64 Groundwater Elevation (ft amsl) in OU3 Monitoring Well, September 2011
- 1010.55* Groundwater Elevation (ft amsl) in CRA Monitoring Well, September 2011
- NM Not Measured
- ** Not Used for Contouring
- ft amsl Feet Above Mean Sea Level

Note: Data for OU3-16M, OU3-19M, and OU3-20M were reported from 3rd Quarter New Groundwater Wells Sampling Event - September 2011

- OU3 Boundary
- OU2 Groundwater Treatment Facility
- PRP Location

N

0 1600
Approx. Scale (feet)

Figure 4
Lower Salt River Gravels Sub-unit
Groundwater Contour Map - September 2011
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona

ERM 02/12

Project No. 0096498.033
Date: 07/02/12
Drawn By: C.Tallada
CAD File: F:\0096498\033\0096498033-02.dwg

McDowell Road
Roosevelt Street
Van Buren Street
Washington Street
Jefferson Street
Buckeye Road

1st Ave
Central Avenue
7th Street
16th Street
7th Avenue

OU3-8D 989.20
Milum Textile Services
Phoenix Newspapers, Inc.
OU3-5DR 999.86
OU3-6D 997.20
OU3-1D 1009.77
OU3-14D 1015.96
EW-22D** 1012.11*
OU3-13D 1007.61**
NW-12D 1013.29*
NW-4D 1010.10*
EW-19D 1007.71
OU3-12D 1009.23
EW-N 1009.03*
EW-M 992.01*
NW-8D 1012.88*
NW-8M 1012.56*
EW-S 980.12*
NW-6D** 1008.71*
McCoy's Cleaners
Baker Metal Products
EW-13-228 1009.07**
EW-13-268 1009.62
Walker Power/ Tiernay Turbines
Westinghouse
NW-7D 1009.13*
NW-14D 1009.77*
NW-16D 1009.96*
NW-11D 1010.34*
NW-13D 1009.62*
NW-9D 1010.97*
NW-9D2 1010.98*
NW-10D 1011.78*
NW-19D 1013.57*
ASE88-B 1015.85*
ASE-77B 1015.11*
DM-515-210 1019.94*
ASE-76B 1019.54*
BC11-B 1023.72*
AVB106-03
Capitol Engineering
Southwest Solvents, Inc.
APS Facility
Union Pacific Railroad
SRP
Adobe/Arvin/Cooper
Wabash-Freuhauf

990 992 994 996 998 1000 1002 1004 1006 1008 1010 1012 1014 1016 1018 1020 1022

OPERABLE UNIT 3

LEGEND

Basin Fill Sub-unit

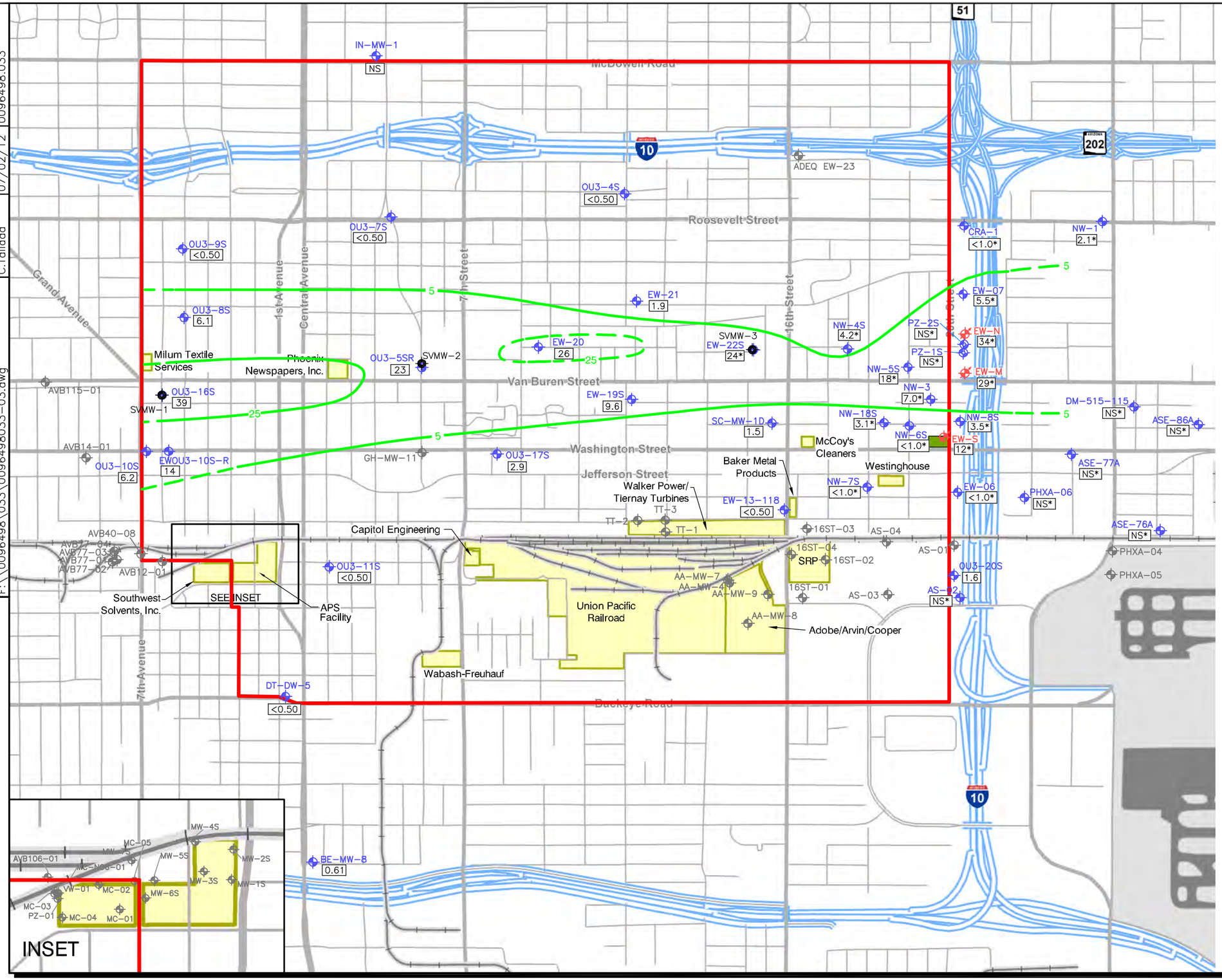
- Monitoring Well
- OU2 Groundwater Extraction Well, Not Used for Contouring
- Well Not Monitored by the OU3 Working Group
- 1010 — Groundwater Elevation Contour (ft amsl); Contour Interval = 2 feet
- 1009.77 Groundwater Elevation (ft amsl) in OU3 Monitoring Well, September 2011
- 1010.97* Groundwater Elevation (ft amsl) in CRA Monitoring Well, September 2011
- ** Not Used for Contouring
- NM Not Measured
- ft amsl Feet Above Mean Sea Level
- Intersect of Basin Fill and Bedrock
- OU3 Boundary
- OU2 Groundwater Treatment Facility
- PRP Location

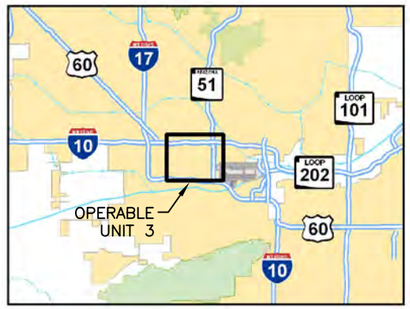
N

0 1600
Approx. Scale (feet)

Figure 5
Basin Fill Sub-unit
Groundwater Contour Map - September 2011
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona
ERM 07/12

Project No. 0096498.033
Date: 07/02/12
Drawn By: C.Tallada
CAD File: F:\0096498\033\00964980333-03.dwg





LEGEND:

Salt River Gravels Sub-unit

- Upper Salt River Gravels (U-SRG) Groundwater Well
- Upper Salt River Gravels (U-SRG) Piezometer
- OU2 Groundwater Extraction Well, Not Used for Contouring
- Well Not Monitored by the OU3 Working Group
- 5 — TCE Concentration Contour; Dashed Where Inferred
- 2.6 — TCE Concentration in OU3 Groundwater Monitoring Well, September 2011
- 1.6* — TCE Concentration in CRA Monitoring Well, September 2011

Notes:
All TCE concentrations in µg/L
TCE = Trichloroethene
µg/L = micrograms per liter
<0.5 = TCE not detected above the laboratory reporting limit.
NS = Not Sampled
Data for OU3-10S, OU3-16S, OU3-17S, and OU3-20S were reported from 3rd Quarter New Groundwater Wells Sampling Event - September 2011

- OU3 Boundary
- OU2 Groundwater Treatment Facility
- PRP Location

N

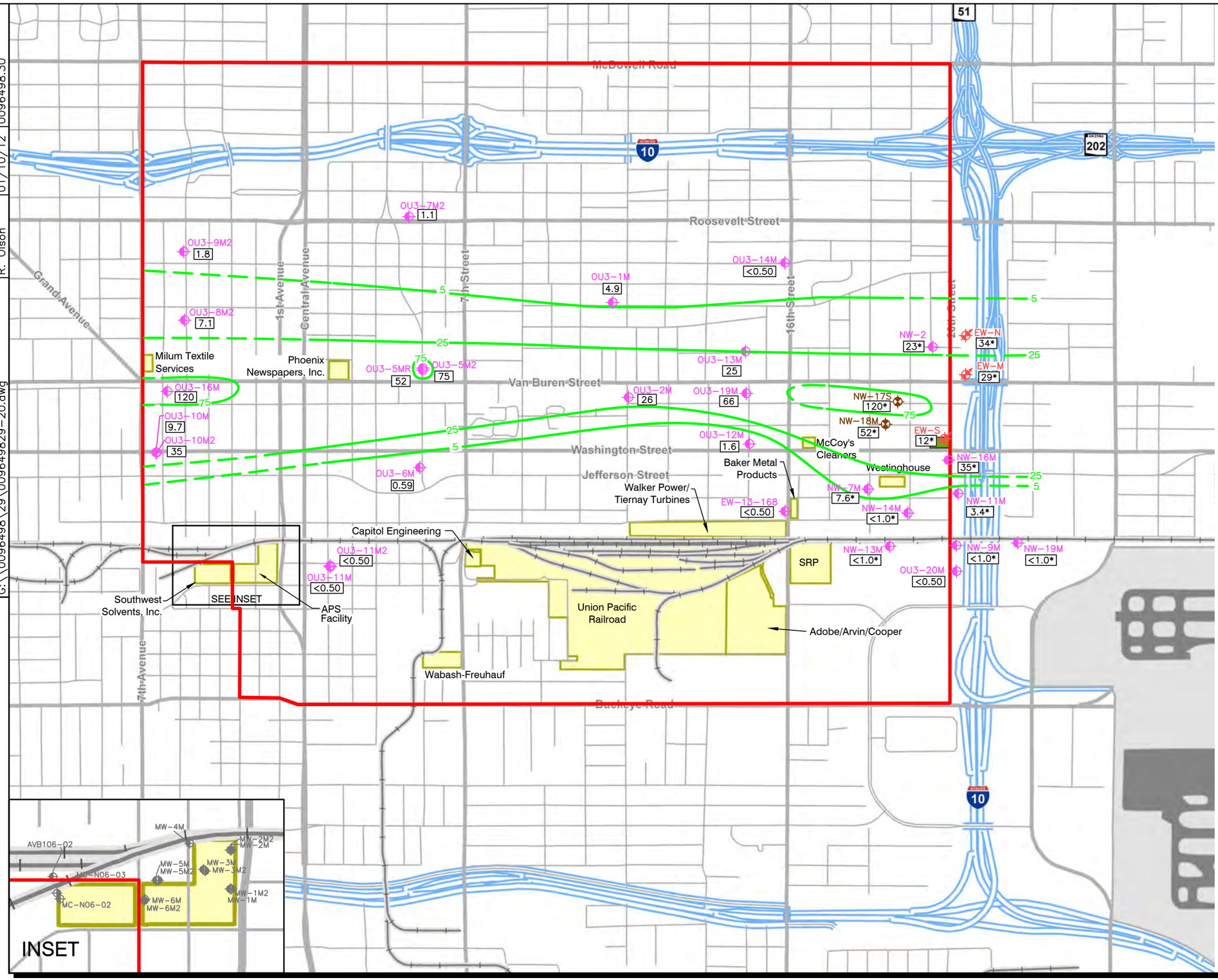
0 1600
Approx. Scale (feet)

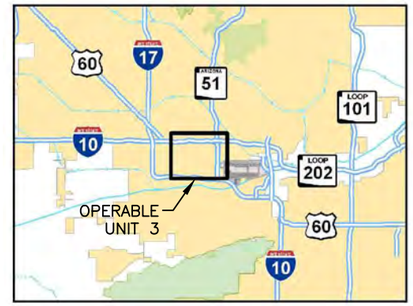
Figure 6

Upper Salt River Gravels Sub-unit
TCE Contour Map - September 2011
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona

ERM 07/12

Project No. 0096498.30
Date: 01/10/12
Drawn By: R. Olson
CAD File: G:\0096498\29\0096498-29-20.dwg





LEGEND

Lower Salt River Gravels Sub-unit

- Lower Salt River Gravels (L-SRG) Groundwater Well
- Colluvium Zone Monitoring Well
- OU2 Groundwater Extraction Well; Not Used for Contouring
- Well Not Monitored by the OU3 Working Group
- 5 — TCE Concentration Contour; Dashed Where Inferred
- [110] TCE Concentration in OU3 Groundwater Monitoring Well, September 2011
- [1.9*] TCE Concentration in CRA Monitoring Well, September 2011

Notes:
All TCE concentrations in µg/L
TCE = Trichloroethene
µg/L = micrograms per liter
<0.5 = TCE not detected above the laboratory reporting limit
NS = Not Sampled
Data for OU3-16M, OU3-19M, and OU3-20M were reported from 3rd Quarter New Groundwater Wells Sampling Event – September 2011

- OU3 Boundary
- OU2 Groundwater Treatment Facility
- PRP Location

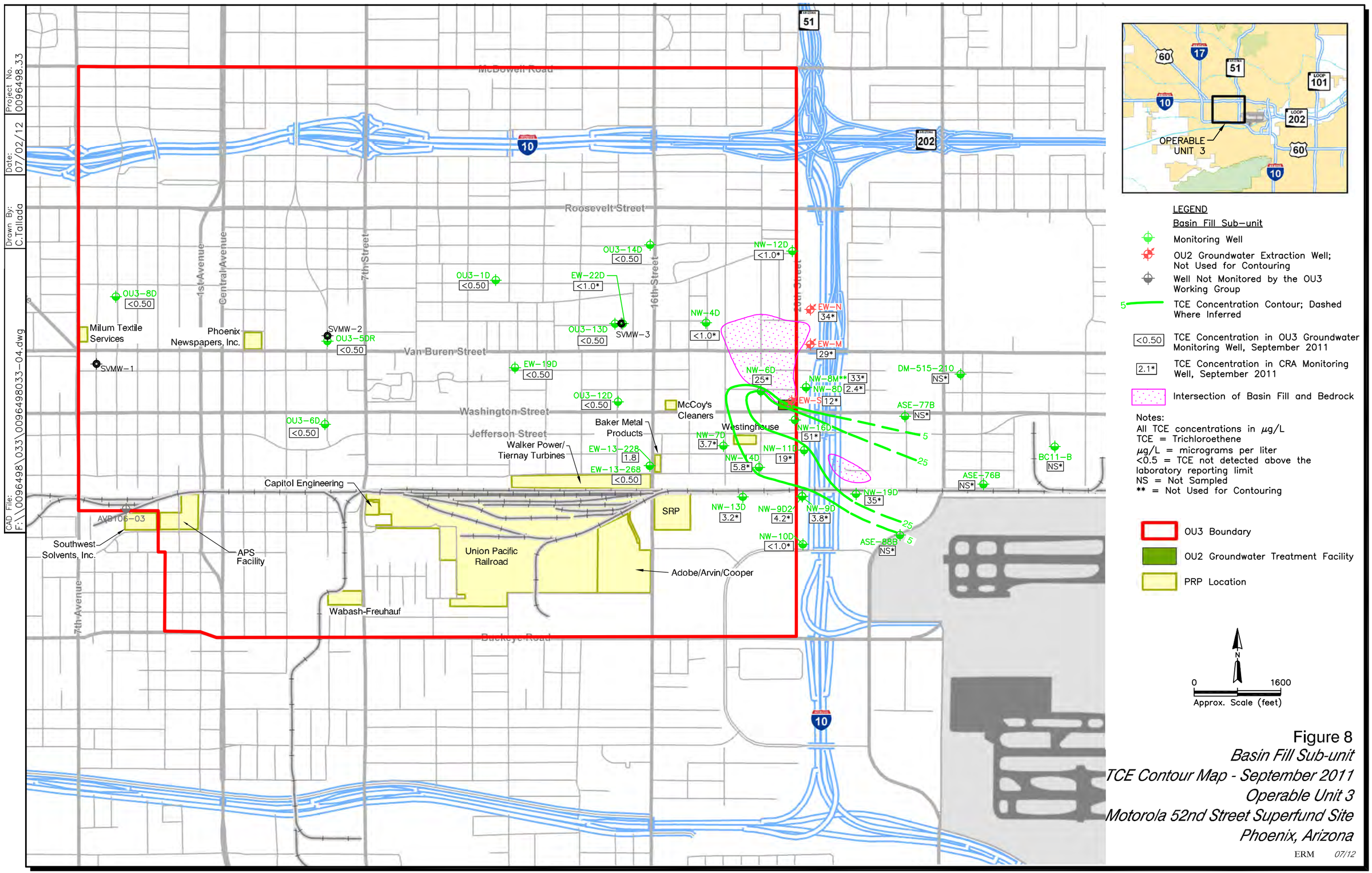
N

0 1600
Approx. Scale (feet)

Figure 7
Lower Salt River Gravels Sub-unit
TCE Contour Map - September 2011
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona

ERM 01/12

Project No. 0096498.33
Date: 07/02/12
Drawn By: C.Tallada
CAD File: F:\0096498\033\0096498033-04.dwg



LEGEND

Basin Fill Sub-unit

- Monitoring Well
- OU2 Groundwater Extraction Well; Not Used for Contouring
- Well Not Monitored by the OU3 Working Group
- 5 — TCE Concentration Contour; Dashed Where Inferred
- <0.50 — TCE Concentration in OU3 Groundwater Monitoring Well, September 2011
- 2.1* — TCE Concentration in CRA Monitoring Well, September 2011
- Intersection of Basin Fill and Bedrock

Notes:
All TCE concentrations in µg/L
TCE = Trichloroethene
µg/L = micrograms per liter
<0.5 = TCE not detected above the laboratory reporting limit
NS = Not Sampled
** = Not Used for Contouring

- OU3 Boundary
- OU2 Groundwater Treatment Facility
- PRP Location

N

0 1600
Approx. Scale (feet)

Figure 8
Basin Fill Sub-unit
TCE Contour Map - September 2011
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona

ERM 07/12

Tables

Table 2

Monitoring Well Construction Details
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona

Well ID	Hydrostratigraphic Zone[1]	Latitude	Longitude	Top of Casing Elevation	Top of Screened Interval	Bottom of Screened Interval	Total Depth	Casing Diameter
Units				ft amsl	ft bgs	ft bgs	ft bgs	(inches)
BE-MW-8	U-SRG	33.4300	-112.0700	1076.35	75	105	105	4
DT-DW-5	U-SRG	33.4370	-112.0747	1077.90	59	99	99	2
EWOU3-10S-R	U-SRG	33.4480	-112.0809	1081.62	60	100	102	4
EW-13-118	U-SRG	33.4454	-112.0478	1092.71	114.5	119.5	309	4
EW-13-168	L-SRG	33.4454	-112.0478	1092.71	164.5	169.5	309	4
EW-13-228	BF	33.4454	-112.0478	1092.71	224.5	229.5	309	4
EW-13-268	BF	33.4454	-112.0478	1092.71	264.5	269.5	309	4
EW-19S	U-SRG	33.4504	-112.0561	1087.32	57	107	112	4
EW-19D	BF	33.4504	-112.0561	1087.34	247	267	270	4
EW-20	U-SRG	33.4528	-112.0561	1091.38	59	109	109	4
EW-21	U-SRG	33.4548	-112.0558	1094.24	58	108	108	4
GH-MW-11	U-SRG	33.4480	-112.0673	1083.30	50	100	100.9	4
IN-MW-1	U-SRG	33.4659	-112.0698	1088.38	70	90	90	4
SC-MW-1D	U-SRG	33.4487	-112.0482	1092.39	83	123	125	4
OU3-1M	L-SRG	33.4548	-112.0571	1093.30	140	160	162	4
OU3-1D	BF	33.4548	-112.0572	1093.09	235	255	259	4
OU3-2M	L-SRG	33.4506	-112.0563	1087.97	150	170	175	4
OU3-4S	U-SRG	33.4597	-112.0565	1094.74	59.2	110	110	4
OU3-5SR	U-SRG	33.4518	-112.0674	1087.28	69.7	119.7	120	4
OU3-5MR	L-SRG	33.4518	-112.0674	1087.37	148.7	168.7	169	4
OU3-5M2	L-SRG	33.4519	-112.0674	1087.24	202.7	222.7	253	4
OU3-5DR	BF	33.4517	-112.0674	1087.35	232.7	252.7	253	4
OU3-6M	L-SRG	33.4474	-112.0675	1083.66	152	172	172.5	4
OU3-6D	BF	33.4475	-112.0675	1083.77	230	250	261	4
OU3-7S	U-SRG	33.4586	-112.069	1085.29	60	110	112	4
OU3-7M2	L-SRG	33.4587	-112.0681	1085.59	195	215	221	4
OU3-8S	U-SRG	33.4541	-112.0802	1080.05	59.9	110.5	110.5	4
OU3-8M2	L-SRG	33.4540	-112.0802	1080.39	205.5	225.6	228	4
OU3-8D	BF	33.4540	-112.0802	1080.00	260.5	270	273	4
OU3-9S	U-SRG	33.4572	-112.0802	1080.55	59.6	110.2	110.5	4
OU3-9M2	L-SRG	33.4571	-112.0802	1080.74	219.7	229.7	235	4
OU3-10M	L-SRG	33.4480	-112.0817	1082.25	146.7	166.7	170	4
OU3-10M2	L-SRG	33.4480	-112.0817	1082.29	199.2	219.2	225	4
OU3-11S	U-SRG	33.4428	-112.0723	1078.26	69.7	119.7	123	4
OU3-11M	L-SRG	33.4429	-112.0723	1078.25	153.7	173.7	178	4
OU3-11M2	L-SRG	33.4429	-112.0723	1078.05	196.7	216.7	230	4
OU3-12M	L-SRG	33.4485	-112.0498	1090.79	146.7	166.7	170	4
OU3-12D	BF	33.4487	-112.0498	1090.77	245.6	265.6	396	4
OU3-13M	L-SRG	33.4526	-112.0500	1095.75	154.7	174.7	175	4
OU3-13D	BF	33.4526	-112.0500	1095.71	224.7	244.7	250	4
OU3-14M	L-SRG	33.4566	-112.0479	1099.05	145.7	165.7	168	4
OU3-14D	BF	33.4566	-112.0478	1099.14	231.2	251.2	251.5	4

Notes:

amsl = above mean sea level
bgs = below ground surface
ft = feet
U-SRG = Upper Salt River Gravels Sub-unit
L-SRG = Lower Salt River Gravels Sub-unit
BF = Basin Fill Sub-unit

Well data information taken from the March 2009 Groundwater Monitoring Report - Operable Unit 3 by Shaw Environmental, Inc. (Shaw 2010).
Hydrostratigraphic zones are from the Sitewide Lithology Table revised June 6, 2011.

[1]Although wells OU3-5M2, OU3-9M2, and OU3-11M2 are screened across portions of SRG and BF, they are classified as SRG wells for mapping purposes.

Table 3

September 2011 Groundwater Sampling Event
Groundwater Elevations Summary
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona

Well ID	Hydrostratigraphic Zone[1]	Gauging Date	Top of Casing Elevation	Screened Interval	Depth To Water	Groundwater Elevation	Groundwater Elevation Change
Units			ft amsl	ft bgs	ft btoc	ft amsl	(From March 2011)
BE-MW-8	U-SRG	9/6/2011	1,076.35	75-105	85.48	990.87	-6.82
DT-DW-5	U-SRG	9/6/2011	1,077.90	59-99	89.28	988.62	-8.31
EWOU3-10S-R	U-SRG	9/6/2011	1,081.62	60-100	98.82	982.80	-8.56
EW-13-118	U-SRG	9/16/2011	1,092.71	114.5-119.5	85.52	1,007.19	-2.17
EW-13-168	L-SRG	9/16/2011	1,092.71	164.5-169.5	85.51	1,007.20	-2.08
EW-13-228	BF	9/16/2011	1,092.71	224.5-229.5	83.64	1,009.07	-2.19
EW-13-268	BF	9/16/2011	1,092.71	264.5-269.5	83.09	1,009.62	-2.40
EW-19S	U-SRG	9/6/2011	1,087.32	57-107	85.87	1,001.45	-3.78
EW-19D	BF	9/6/2011	1,087.34	247-267	79.63	1,007.71	-6.07
EW-20	U-SRG	9/6/2011	1,091.38	59-109	92.47	998.91	-3.94
EW-21	U-SRG	9/6/2011	1,094.24	58-108	91.40	1,002.84	-3.35
IN-MW-1	U-SRG	9/6/2011	1,088.38	70-90	88.57	999.81	-0.71
SC-MW-1D	U-SRG	9/6/2011	1,092.39	83-123	86.35	1,006.04	-3.33
OU3-1M	L-SRG	9/6/2011	1,093.30	140-160	91.03	1,002.27	-3.07
OU3-1D	BF	9/6/2011	1,093.09	235-255	83.32	1,009.77	-5.00
OU3-2M	L-SRG	9/6/2011	1,094.74	59.2-110	86.08	1,008.66	-3.63
OU3-4S	U-SRG	9/6/2011	1,094.74	59.2-110	90.52	1,004.22	-2.19
OU3-5SR	U-SRG	9/6/2011	1,087.28	69.7-119.7	91.50	995.78	-4.77
OU3-5MR	L-SRG	9/6/2011	1,087.37	148.7-168.7	91.65	995.72	-4.81
OU3-5M2	L-SRG	9/6/2011	1,087.24	202.7-222.7	91.60	995.64	-4.84
OU3-5DR	BF	9/6/2011	1,087.35	232.7-252.7	87.49	999.86	-1.26
OU3-6M	L-SRG	9/6/2011	1,083.66	152-172	89.35	994.31	-5.88
OU3-6D	BF	9/6/2011	1,083.77	230-250	86.57	997.20	-6.51
OU3-7S	U-SRG	9/6/2011	1,085.29	60-110	87.62	997.67	-3.13
OU3-7M2	L-SRG	9/6/2011	1,085.59	195-215	87.70	997.89	-3.17
OU3-8S	U-SRG	9/6/2011	1,080.05	59.9-110.5	93.13	986.92	-6.52
OU3-8M2	L-SRG	9/6/2011	1,080.39	205.5-225.6	92.90	987.49	-6.59
OU3-8D	BF	9/6/2011	1,080.00	260.5-270	90.80	989.20	-8.28
OU3-9S	U-SRG	9/6/2011	1,080.55	59.6-110.2	91.97	988.58	-5.32
OU3-9M2	L-SRG	9/6/2011	1,080.74	219.7-229.7	89.91	990.83	-3.38
OU3-10M	L-SRG	9/6/2011	1,082.25	146.7-166.7	98.70	983.55	-8.63
OU3-10M2	L-SRG	9/6/2011	1,082.29	199.2-219.2	98.89	983.40	-8.92
OU3-11S	U-SRG	9/6/2011	1,078.26	69.7-119.7	88.46	989.80	-7.66
OU3-11M	L-SRG	9/6/2011	1,078.25	153.7-173.7	88.54	989.71	-7.61
OU3-11M2	L-SRG	9/7/2011*	1,078.05	196.7-216.7	88.39	989.66	-7.64
OU3-12M	L-SRG	9/6/2011	1,090.79	146.7-166.7	85.45	1,005.34	-3.46
OU3-12D	BF	9/6/2011	1,090.77	245.6-265.6	81.54	1,009.23	-4.84
OU3-13M	L-SRG	9/6/2011	1,095.75	154.7-174.7	90.34	1,005.41	-3.04
OU3-13D	BF	9/6/2011	1,095.71	224.7-244.7	88.10	1,007.61	-3.79
OU3-14M	L-SRG	9/6/2011	1,099.05	145.7-165.7	91.30	1,007.75	-2.19
OU3-14D	BF	9/6/2011	1,099.14	231.2-251.2	83.18	1,015.96	-3.83
						Average =	-4.72

Notes:

amsl = above mean sea level
btoc = below top of casing
bgs = below ground surface
ft = feet
U-SRG = Salt River Gravels Sub-unit
L-SRG = Lower Salt River Gravels Sub-unit
BF = Basin Fill Sub-unit

Well information taken from the March 2009 Groundwater Monitoring Report - Operable Unit 3 by Shaw Environmental, Inc. (Shaw 2010).

Hydrostratigraphic zones are from the Sitewide Lithology Table revised June 6, 2011.

[1]Although wells OU3-5M2, OU3-9M2, and OU3-11M2 are screened across portions of SRG and BF, they are classified as SRG wells for mapping purposes.

*Not gauged, vehicle parked on well. Gauged at a later date.

Table 6

September 2011 Groundwater Sampling Event
Analytical Data Summary
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona

Well ID	Hydrostratigraphic Zone[1]	Sample Date	Screened Interval	TCE	PCE	cis-1,2-DCE	1,1-DCA	1,1-DCE	1,4-Dioxane
Units			ft btoc	µ/L	µ/L	µ/L	µ/L	µ/L	µ/L
AWQS				**5**	**5**	**70**	NA	**7**	NA
BE-MW-8	U-SRG	9/12/2011	75-105	0.61	**5.2**	< 0.50	< 0.50	< 0.50	< 1.0
DT-DW-5	U-SRG	9/16/2011	59-99	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	1.2
EW-13-118	U-SRG	9/20/2011	114.5-119.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
EW-13-168	L-SRG	9/16/2011	164.5-169.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.2
EW-13-228	BF	9/16/2011	224.5-229.5	1.8	< 0.50	< 0.50	< 0.50	< 0.50	< 1.2
EW-13-268	BF	9/16/2011	264.5-269.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.2
EW-19D	BF	9/15/2011	247-267	< 0.50	< 0.50 UJ	< 0.50	< 0.50	< 0.50	< 1.0
EW-19S	U-SRG	9/15/2011	57-107	**9.6**	0.69 J	2.4	1.8	2.5	1.2
EW-20	U-SRG	9/15/2011	59-109	**26**	1.1 J	5.2	3.4	2.6	1.5
EW-20-Q1	U-SRG	9/15/2011	59-109	**24**	1.2 J	5.2	3.2	3.2	1.5
EW-21	U-SRG	9/12/2011	58-108	1.9	< 0.50	< 0.50 UJ	< 0.50	< 0.50	< 1.0
EWOU3-10S-R	U-SRG	9/13/2011	60-100	**14**	0.79	2.2	2.1	< 0.50	1.6
OU3-1M	L-SRG	9/12/2011	140-160	4.9	< 0.50	0.70 J	< 0.50	< 0.50	< 1.0
OU3-1D	BF	9/12/2011	235-255	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
OU3-2M	L-SRG	9/15/2011	150-170	**26**	1.1 J	5.5	3.4	5.6	1.8
OU3-4S	U-SRG	9/8/2011	59.2-110	< 0.50	2.5	< 0.50	< 0.50	< 0.50	< 1.0
OU3-5SR	U-SRG	9/14/2011	69.7-119.7	**23**	1.1	5.1	3.3	3.8	1.6
OU3-5MR	L-SRG	9/14/2011	148.7-168.7	**52**	2.2	10	5.1	6.7	2.1
OU3-5MR-Q1	L-SRG	9/14/2011	148.7-168.7	**48**	2.0	9.7	4.8	6.7	2.1
OU3-5M2	L-SRG	9/14/2011	202.7-222.7	**75**	3.2	14	5.2	**7.9**	2.3
OU3-5DR	BF	9/14/2011	232.7-252.7	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
OU3-6M	L-SRG	9/12/2011	152-172	0.59	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
OU3-6D	BF	9/12/2011	230-250	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
OU3-7S	U-SRG	9/8/2011	60-110	< 0.50	2.8	< 0.50	< 0.50	< 0.50	< 1.0
OU3-7M2	L-SRG	9/8/2011	195-215	1.1	1.5	< 0.50	< 0.50	< 0.50	< 1.0
OU3-8S	U-SRG	9/13/2011	59.9-110.5	**6.1**	0.82	0.86	< 0.50	< 0.50	< 1.2
OU3-8M2	L-SRG	9/13/2011	205.5-225.6	**7.1**	< 0.50	0.54	< 0.50	< 0.50	< 1.0
OU3-8D	BF	9/13/2011	260.5-270	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
OU3-9S	U-SRG	9/9/2011	59.2-110.2	< 0.50	1.4	< 0.50	< 0.50	< 0.50	< 1.0
OU3-9M2	L-SRG	9/9/2011	219.7-229.7	1.8	3.3	< 0.50	< 0.50	< 0.50	< 1.0
OU3-10M	L-SRG	9/13/2011	146.7-166.7	**9.7**	0.58	2.5	2.1	2.8	1.4
OU3-10M2	L-SRG	9/13/2011	199.2-219.2	**35**	1.9	6.9	5.4	**9.4**	3.1
OU3-10M2-Q1	L-SRG	9/13/2011	199.2-219.2	**33**	1.8	6.5	5.2	**8.8**	3.0
OU3-11S	U-SRG	9/14/2011	69.7-119.7	< 0.50	1.0	< 0.50	< 0.50	< 0.50	< 1.0
OU3-11M	L-SRG	9/14/2011	153.7-173.7	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	1.1
OU3-11M2	L-SRG	9/14/2011	196.7-216.7	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
OU3-12M	L-SRG	9/9/2011	146.7-166.7	1.6	< 0.50	< 0.50	< 0.50	1.1	< 1.0
OU3-12D	BF	9/9/2011	245.6-265.6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
OU3-13M	L-SRG	9/15/2011	154.7-174.7	**25**	0.57 J	2.4	< 0.50	< 0.50	< 1.0
OU3-13D	BF	9/15/2011	224.7-244.7	< 0.50	< 0.50 UJ	< 0.50	< 0.50	< 0.50	< 1.0
OU3-14M	L-SRG	9/8/2011	145.7-165.7	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
OU3-14D	BF	9/8/2011	231.2-251.2	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
SC-MW-1D	U-SRG	9/9/2011	83-123	1.5	< 0.50	< 0.50	0.81	0.81	< 1.0

Notes:

1,1-DCA = 1,1-Dichlororethane
1,1-DCE = 1,1-Dichloroethene
cis-1,2-DCE = cis-1,2-Dichloroethene
PCE = Tetrachloroethene
TCE = Trichloroethene
AWQS = Arizona Water Quality Standards
BOLD = greater than or equal to the AWQS
EPA = Environmental Protection Agency
ft = feet
btoc = below top of casing

µg/L = micrograms per liter
NA = not applicable or no standard
< = concentration is less than indicated detectable value
UJ = indicates a nondetect result estimated at the laboratory report limit
J = indicates an estimated detect result
J[1] = indicates a nondetect result flagged as an estimated detect result, as per data validation report
Q1 = sample is field duplicate
Well information taken from the March 2009 Groundwater Monitoring Report - Operable Unit 3 by Shaw Environmental, Inc. (Shaw 2010).
Hydrostratigraphic zones are from the Sitewide Lithology Table revised June 6, 2011.
[1]Although wells OU3-5M2, OU3-9M2, and OU3-11M2 are screened across portions of SRG and BF, they are classified as SRG wells for mapping purposes.

BF = Basin Fill Sub-unit
U-SRG = Upper Salt River Gravels Sub-unit
L-SRG = Lower Salt River Gravels Sub-unit

Table 7

September 2011 Groundwater Sampling Event
Non-OU3 Program Monitoring Well Construction Details,
Groundwater Depths, and TCE Concentrations
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona

Well ID	Hydrostratigraphic Zone[1]	Top of Casing Elevation	Top of Screened Interval	Bottom of Screened Interval	Total Depth	Groundwater Elevation	TCE
Units		ft amsl	ft bgs	ft bgs	ft bgs	ft amsl	µg/L
AWQS							**5**
AS-02	U-SRG	1099.67	50	90	--	1012.03	--
ASE-28A	U-SRG	1108.28	--	--	--	1022.19	--
ASE-36A	U-SRG	1102.58	69	99	--	1018.36	--
ASE-76A	U-SRG	1105.42	80	130	130	1019.79	--
ASE-76B	BF	1105.34	180	230	265	1019.54	--
ASE-77A	U-SRG	1101.86	85	115	115	1015.96	--
ASE-77B	BF	1101.76	180	230	258	1015.11	--
ASE-86A	U-SRG	1106.07	86	126	--	1022.63	--
ASE-88B	BF	1103.08	175	215	230	1015.85	--
BC11-B	BF	1111.25	135	160	--	1023.72	--
CRA-1	U-SRG	1106.48	105.5	125.5	270	1015.61	<1.0
DM-515-115	U-SRG	1103.61	115	--	--	1020.02	--
DM-515-210	BF	1103.61	210	--	--	1019.94	--
EW-06	U-SRG	1097.57	61	111	112	1010.71	<1.0
EW-07	U-SRG	1104.99	78	128	129	1012.39	**5.5**
EW-22D	BF	1095.81	407	427	430	1012.11	<1.0
EW-22S	U-SRG	1095.81	58	108	112	1005.27	**24**
EW-SPZ1	SRG* / BF	1098.26	118	208	--	1009.41	--
EW-M	SRG* / BF	1103.61	86	206	233	992.01	**29**
EW-N	SRG* / BF	1110.78	100	220	240	1009.03	**34**
EW-S	SRG* / BF / BR	1100.37	94	194	215	980.12	**12**
NW-1	U-SRG	1112.22	90	110	211	1030.04	2.1
NW-2	L-SRG	1101.87	173	193	212	1008.72	**23**
NW-3	U-SRG	1097.16	120	140	158	1008.31	**7**
NW-4D	BF	1099.92	182.5	202.5	221	1010.10	<1.0
NW-4S	U-SRG	1099.96	90	130	221	1007.97	4.2
NW-5S	U-SRG	1099.98	88	128	147	1008.09	**18**
NW-6D	BF	1096.92	181.5	201.5	217.5	1008.71	**25**
NW-6S	U-SRG	1096.82	89.5	129.5	130	1008.34	<1.0
NW-7D	BF	1094.21	215	235	298	1009.13	2.4/3.7
NW-7M	L-SRG	1093.94	180	200	--	1008.01	**7.6**
NW-7S	U-SRG	1094.19	89.5	129.5	130	1008.67	<1.0
NW-8D	BF	1098.72	224	244	248	1012.88	2.4/2.4
NW-8M	BF	1098.65	175	195	195	1012.56	**33**
NW-8S	U-SRG	1098.45	99	149	151	1009.44	3.5
NW-9D	BF	1099.58	210	230	230	1010.97	3.8
NW-9D2	BF	1099.58	240	260	270	1010.98	4.2/4.2
NW-9M	L-SRG	1099.42	170	190	--	1012.77	<1.0
NW-10D	BF	1098.91	210	230	300	1011.78	<1.0
NW-11D	BF	1097.69	210	230	287	1010.34	**19**
NW-11M	L-SRG	1097.59	173	193	193	1010.55	3.4
NW-12D	BF	1104.10	225	245	300	1013.29	<1.0
NW-13D	BF	1096.11	215	235	--	1009.62	3.0/3.2
NW-13M	L-SRG	1095.75	175	195	--	1009.57	<1.0
NW-14D	BF	1099.62	215	235	--	1009.77	**5.8**
NW-14M	L-SRG	1099.05	175	195	--	1009.73	<1.0
NW-16M	L-SRG	1097.92	155	175	--	1009.88	**35**
NW-16D	BF	1097.96	220	230	--	1009.96	**51**
NW-17S	CV	1096.75	130	145	--	1008.22	**120**
NW-18S	U-SRG	1094.78	90	130	--	1008.06	3.1
NW-18M	CV	1094.92	170	190	--	1008.10	**52**
NW-19M	L-SRG	1100.69	165	185	--	1013.72	<1.0
NW-19D	BF	1100.50	205	220	--	1013.57	**35**
PHXA-06	U-SRG	1100.84	50	140	205	1014.40	--
PZ-1S	U-SRG	1102.41	99	119	258	1008.43	--
PZ-1D	BR	1102.69	217	237	--	1008.47	--
PZ-2S	U-SRG	1107.92	125	145	269	1009.10	--
PZ-2D	BR	1107.95	245	265	--	1009.07	--
TEW-1	U-SRG	1103.47	100	145	160	1008.46	--

Notes:

-- = no data
U-SRG = Salt River Gravels Sub-unit
L-SRG = Lower Salt River Gravels Sub-unit
BF = Basin Fill Sub-unit
BR = Bedrock
CV = Colluvium
SRG* = Screened in U-SRG and L-SRG
bgs = below ground surface
µg/L = micrograms per liter
ft = feet
TCE = Trichloroethene
amsl = above mean sea level
BOLD = greater than or equal to the AWQS
AWQS = Arizona Water Quality Standards
[1]Unless otherwise noted with asterisk, revised stratigraphic zones are from Sitewide Lithology Table revised June 6, 2011.
Well construction, TCE, GW elevation data and data validation flags from *Data Transmittals received from CRA on 12/6/11 and 12/19/11* (CRA 2011)
Non-OU3 SRG is not typically broken into U-SRG and L-SRG divisions. Table 7 makes this distinction to facilitate the incorporation of non-OU3 data into Figures 3, 4, 6, and 7, which do distinguish between an Upper and L-SRG.